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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/602,291	06/24/2003	Elizabeth A. Dauch	NEC0252US	1241
33031	7590	04/29/2004	EXAMINER	
CAMPBELL STEPHENSON ASCOLESE, LLP			GURLEY, LYNNE ANN	
4807 SPICEWOOD SPRINGS RD.			ART UNIT	
BLDG. 4, SUITE 201			PAPER NUMBER	
AUSTIN, TX 78759			2812	

DATE MAILED: 04/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/602,291

Applicant(s)

DAUCH ET AL.

Examiner

Lynne A. Gurley

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 12 February 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 11-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some \* c) ☐ None of:

- ☐ Certified copies of the priority documents have been received.
- ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
- ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

LYNNE A. GURLEY

PRIMARY PATENT EXAMINER

TC 2800, AU 2812

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
  - ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
  - ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
- Paper No(s)/Mail Date \_\_\_\_\_.

- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

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### **DETAILED ACTION**

This Office Action is in response to the election filed 2/12/04.

Currently, claims 1-26 are pending. Claims 1-10 have been elected without traverse.

Claims 11-26 are non-elected.

#### ***Election/Restrictions***

1. Applicant's election without traverse of claims 1-10 in the response filed 2/12/04 is acknowledged.
2. Claims 11-26 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the response filed 2/12/04.

#### ***Specification***

1. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

#### ***Claim Objections***

2. Claim 10 is objected to because of the following informalities: The period is missing at the end of the claim. Appropriate correction is required.

*Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-2, and 7-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Mautz et al. (US 5,476,816, dated 12/19/95).

5. Mautz shows the method as claimed in Figures 3-6 and corresponding text as: forming a tungsten plug 32/31 in a dielectric layer 28; forming an electrically conductive interconnect line 41 on the dielectric layer after formation of the tungsten plug, wherein the tungsten plug is electrically connected to the electrically conductive interconnect line; contacting the electrically conductive interconnect line with water after formation of the electrically conductive interconnect line; wherein the electrically conductive interconnect line is contacted with the water for less than 120 minutes (column 4, lines 2-27; column 5, lines 30-35, lines 53-56; column 6, lines 2-4, lines 28-29, lines 45-61; column 7, lines 2-17). The water is a deionized liquid and, may contact the interconnect for 60-120 seconds or 45-120 seconds or 1-10 minutes; and there may be a solution rinse to remove residual polymer after contacting the interconnect with water (column 6, lines 25-30, lines 45-62; column 7, lines 1-16). The interconnect materials are discussed (column 4, lines 8-27).

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6. Claims 1, 3, 5, and 7-9 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Tsai et al. (US 6,410,417, dated 6/25/02).

Tsai shows the method as claimed, in figures 1-4 and corresponding text, with tungsten plug 104, interconnect 108/110 (column 2, lines 50-61) and an ashing technique to remove the photoresist after patterning the interconnect which exposes the interconnect to oxygen plasma and water vapor (abstract; column 2, lines 5-10; column 3, lines 21-35) or water plasma (column 3, lines 15-20).

### *Claim Rejections - 35 USC § 103*

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

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claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mautz et al. (US 5,476,816, dated 12/19/95) in view of Tsai et al. (US 6,410,417, dated 6/25/02).

Mautz shows the method substantially as claimed and as shown in the preceding paragraphs.

Mautz lacks anticipation only in not teaching that: 1) the water is deionized but not degasified; the water is degasified but not deionized; the water is neither degasified nor deionized; and the water has a pH that is at or near neutral.

Tsai teaches, in figs. 1-4 and corresponding text, a tungsten plug and interconnect formation method which uses oxygen plasma and water vapor to remove the photoresist after patterning the interconnect. The water vapor or water plasma is used to reduce the amount of wafer charging and to protect the tungsten from erosion in case of misalignment as seen in fig. 4 (column 2, lines 1-10 and lines 50-61; column 3, lines 10-35).

It would have been obvious to one of ordinary skill in the art to have modified the properties of the water in the method of Mautz, pertaining to ionization and degasification and pH, with consideration for tungsten erosion and misalignment as taught by Tsai and, with the motivation that changing these parameters would take into consideration the amount of charged

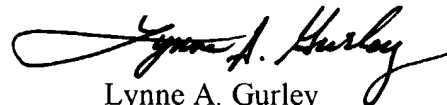
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particles desired on the surface of the interconnect as well as processing temperatures and volatility in handling the solutions (pH).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynne A. Gurley whose telephone number is 571-272-1670. The examiner can normally be reached on M-F 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on 571-272-1679. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Lynne A. Gurley  
Primary Patent Examiner  
TC 2800, AU 2812

LAG

April 26, 2004